the original text is closely followed and accurately rendered, the result is, unlike some translations, such pleasant reading that the student will scarcely realize that it is a translation. But in justice to the author it must be said that this is also partly due to the simple style and language of the original, and to the lecture-form of its arrangement.

The aim of the author has been to deal with such portions of the subject as are "ripe for a connected account," omitting "all disconnected facts and mere descriptive matter" and all descriptions of analytical methods; to provide such references to the literature of the subject as shall more particularly suffice to put the student on the track of the remainder; and thus as a whole to tell the reader what is most certainly known, and to enable him to pursue further any points in which he is specially interested. In all this the author has been very successful, and particularly with respect to the references to original memoirs, which are quoted judiciously and comprehensively. The work is divided into twenty-one lectures. Of these the first propounds the author's views as to the "aims and prospects of modern physiological research," and consists of a somewhat remarkable protest against the modern tendency to regard cell-activity as the expression and outcome of chemical, physical, and mechanical processes. It is indeed a distinct return to the vitalistic views of the past, and urges the existence of some psychological factor of activity, based on the belief that "for the moment it is not apparent how any further progress of importance can be made with the help of chemistry, physics, and anatomy only;" and concludes by saying that "what these sciences fail to achieve will stand out more prominently, and thus the mechanical theories of the present will assuredly carry us eventually to the vitalism of the future." There are probably few physiologists who will agree with this view. Most will rather hold with Heidenhain (*Pflüger's Archiv*, xliii., Suppl.-Hft. p. 63) that, granted the existence of the psychological factor, still it must produce its recognizable effects by purely chemical, physical, and mechanical means, and accept those views of the "activity" of a cell which stand out so clearly in his masterly work on secretion.

The second and third lectures treat of the chemical elements which constitute living organisms, their circulation through the vegetable and animal kingdoms, the principle of the conservation of energy as applied to living things, and, finally, the correlation of plants and animals. The next three lectures deal with the organic food-stuffs and foods, their composition, importance, and function, in connection with nutrition. In these a clear and comprehensive account is given of the various endeavours which have been made to determine the molecular weight of proteids. The sections on the *rôle* of gelatin and cellulose, and of a vegetarian diet in general, are most instructive, and there is a very full statement of the physiology of the organic compounds of iron, leading up to the author's views as to the mode of action of iron-salts in the treatment of chlorosis. Lecture VII., on the inorganic food-stuffs, contains an interesting and valuable account of various salts, more particularly those of sodium and potassium, in their relationship to nutrition; and Lecture VIII. concludes this part of the subject by treating of subsidiary articles of diet, such as tea, coffee, alcohol, bouillon, &c. Digestion and the absorption of digestive products form the subject-matter of Lectures IX.-XII. In these the well-selected and copious references to the literature of the subject will be found to be by no means the least valuable part. Lecture XIII., on the chemistry of blood and lymph, will probably disappoint those who turn to it for an account of the clotting of blood. Perhaps Prof. Bunge thinks the subject not yet "ripe for a connected account," and this is, perhaps, to a large extent true. Still, he would have done well to treat it from a general point of view, rather than almost entirely with regard to the part played by the leucocytes: some account at least of the work of Hammarsten and the translator seems called for in connection with this part of the subject. The gases of the blood, and their relation to the processes of external and internal respiration, are dealt with in the next two lectures. These call for no special remark apart from saying that the fact that the oxidations of the body take place in the tissues might have been more decisively brought out. Existing views as to the condition of CO_2 in the blood are clearly stated. Lecture XVI. gives an admirable exposition of recent work and existing views as to the seat and mode of formation of the nitrogenous products of metabolism, followed, in natural sequence, by a chapter on the functions of the kidneys and chemistry of urine. Hepatic metabolism is the subject of Lecture XVIII. In this the questions which arise with regard to its glycogenic activity are scarcely so clearly put forward as might be expected. On the other hand, the older and current views on fat-formation are well explained in Lecture XX. The remaining lectures (XIX. and XXI.) deal with the source of muscular energy and diabetes respectively.

It is well for those English students who cannot read the original that this interesting and instructive work by Prof. Bunge has, in this well-turned version, been made accessible to them. We cannot conclude better than by hoping it may attain the recognition and approval in this country which it so fully deserves from every point of view, and which it appears to have already secured in the original, judging by the speedy issue of the second edition, of which the copy here reviewed is a translation.

THE ADVANCEMENT OF SCIENCE.

The Advancement of Science: Occasional Essays and Addresses. By E. Ray Lankester, M.A., LL.D., F.R.S. (London: Macmillan and Co., 1890.)

UNDER this title, Prof. Ray Lankester has republished a number of essays, which have appeared at intervals during the last eighteen years. All of them are of more or less permanent interest, and we are glad to have them presented to us in the convenient form of a well-printed octavo volume. While some of the essays are somewhat too technical for the general reader, the majority are of great and very general interest, well worthy of being read and thought over by all.

These essays are nine in number. The last treats of the history and scope of zoology, and is reprinted from the last edition of the "Encyclopædia Britannica"; it forms a most excellent treatise on the subject, and fairly though briefly sketches the history of zoology from the

© 1890 Nature Publishing Group

seventeenth century to the present day. In the second essay the relations that should exist between the State and biology are considered, and there can be little doubt but that as a result of this address to the Biological Section of the British Association at Southport, followed by the fifth essay, which gives an outline of the scientific results of the International Fisheries Exhibition, held in London in the same year (1883), we are in great measure indebted for the valuable help given by our Government towards the establishment of the Laboratory at Plymouth belonging to the Marine Biological Association of the United Kingdom.

The third and sixth essays, on Pasteur and hydrophobia —or rabies, as we would prefer to call this formidable disease—and on centenarism, are full of interest, and while in the former the author has to content himself with a narration of the chief results of Pasteur's invaluable labours, in the latter we find an account of a subject which has been critically worked out by himself.

Three of the essays relate to the subject of Darwinism, and possibly will be found the most interesting in the volume. The first is on the subject of "Degeneration, a chapter in Darwinism," and was delivered as one of the evening lectures at the British Association meeting at Sheffield, in 1879. In it Prof. Lankester calls attention to the fact that degeneration, or the simplification of the general structure of an animal, may be due to the ancestors of that animal having taken to one of two habits of life, either the parasitic or the immobile. Other new habits of life appear also to be such as to lead to degeneration. Let us suppose, for example, a race of animals fitted and accustomed to catch their food, and having a variety of organs to help them in this chase; suppose such animals suddenly to acquire the power of feeding on the carbonic acid dissolved in the water around them, just as green plants have. This would lead to degeneration; for they would soon cease to hunt their food, and would bask in the sunlight, taking food in by the whole surface, as plants do by their leaves. Another possible cause of degeneration appears to be the indirect one of minute size. And so, as is well shown, this hypothesis of degeneration enables very numerous cases of animal structure to be accounted for. The second of this set, forming the seventh of the collected series, is on parthenogenesis, and in it we find the fascinating accounts given to us by the painstaking zeal of von Siebold of the habits and manners of the little wasps belonging to the genus Polistes—a story both wonderful and romantic. The third of these, the eighth of the whole set, treats of Haeckel's theory of heredity, in which the transmission of acquired characters by heredity is discussed, but this phase of belief Prof. Lankester will no longer insist upon, and he points out that Weismann's essays on this question should be carefully studied by naturalists.

The last essay to be alluded to is the fourth, on examinations. The author claims that but few have had a wider or a more continuous experience in examinations than he has had. On this somewhat vexed question he has a good deal that is to the point to say, showing that the use of examinations in schools and Universities is different from their use as a test of fitness for entrance into a profession, or a post in the Home or Indian Civil Service, or as a means of deciding a question of relative merit.

We feel sure that as each of these essays originated in a desire to promote the interests of science, so the author, in collecting the present series, will be found to have had the same aim in view.

OUR BOOK SHELF.

Agenda du Chimiste. Par MM. Salet, Girard, et Pabst. (Paris: Hachette and Co., 1890.)

In this volume will be found a most complete and exhaustive compilation of facts and numerical tables of use to the chemist. The first edition was published in 1877 by M. Wurtz, and in subsequent editions the work has been thoroughly brought up to date. It is now published annually as a chemical year-book, the publication of each year containing a few special articles called for by the events of the past twelve months. This year the following are among the special articles contributed: "The Progress of the Industry of Colouring Matters," "Review of the Exhibition of 1889" as regards matters of chemical interest, and "Views of the International Chemical Congress concerning Nomenclature." The numerical data included in the book are most full, and ought to be of great service in the reduction of observations. The collection of them represents an immense amount of labour, and the accompanying descriptions of experimental methods are very clear and concise. A most useful portion of the work is that in which all the known physical constants of the elements and numerous compounds are given. Special care appears to have been taken in collecting the published thermo-chemical data, with the result that the chapter upon this subject is one of the most valuable in the book. The tables for use in quantitative analysis, and especially those referring to commercial methods, will doubtless be fully appreciated for the saving of time and arithmetical labour which their use will effect. It is, moreover, of no mean advantage that all formulæ are given according to the ordinary nomenclature, and not according to the old notation still retained by many French chemists. The volume is small and handy in spite of its five hundred pages, and cannot fail to be of service in the laboratory. A. E. T.

The Philosophy of Clothing. By W. Mattieu Williams. (London: Thomas Laurie, 1890.)

Mr. Williams is a somewhat eccentric writer, and by most people some of the notions set forth in this little book will be regarded as "fads." He is generally able, however, to give a good reason for the opinions he advances, and much of his advice, although opposed to the rules of fashion, is sound and practicable. The subject is one which occupied the close attention of Count Rumford; and of his researches Mr. Williams, as he himself says, has made "free use."

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* Nature. *No notice is taken of anonymous communications.*]

The Zoological Affinities of *Heliopora cerulea*, Bl.

The remarkable blue coral, *Heliopora cerulea*, of Blainville, represents, I believe, one of those species that, in common with *Stylaster*, *Millepora*, and other allied genera, have been recently relegated to the Hydrozoic subdivision of the Cœlenterata. So far as I remember, however, and without having present access

© 1890 Nature Publishing Group